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ABSTRACT

Educational technology units must continually monitor their strategic plans to ensure that they are aligned with the realities of their institutions. Strategic dissonance occurs when previously successful strategies are no longer achieving the same positive outcomes. The Virtual Retina CD-ROM project is used in this paper as an example of strategic dissonance for the Academic Technologies Center (ATL) at the University of Alberta. In addition, a number of methods for analyzing the strategies used by educational technology units are presented. These methods provide a means for units in higher education to conduct the ongoing task of maintaining their strategic plans. The following questions are used to structure the discussion: (1) What is the unit's external competitive environment? (2) How well is the present strategy working? (3) What are the organization's resource strengths and weaknesses and its external opportunities and threats? (4) Are the educational technology unit's prices and costs competitive? (5) How strong is the center's competitive position? (6) What strategic issues do educational technology units face? (AEF)

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The Virtual Retina: Is Good Educational Technology Always Strategic?

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Educational technology units must continually monitor their strategic plans to ensure that they are aligned with the realities of their institutions. Strategic dissonance occurs when previously successful strategies are no longer achieving the same positive outcomes. The Virtual Retina project is used here as an example of strategic dissonance for the Academic Technologies Centre (ATL) at the University of Alberta. In addition, a number of methods for analyzing the strategies used by educational technology units are presented. These methods provide a means for units in higher education to conduct the ongoing task of maintaining their strategic plans.

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The Academic Technologies for Learning Centre (ATL) is the campus educational technology unit at the University of Alberta. For over five years, it has effectively facilitated the professional development of instructors and supported the production of educational resources. The educational technology environment is a "high velocity" world with rapidly shifting demands and expectations. This necessitates that units such as ATL continually monitor the effectiveness of their strategic plans to ensure that they are aligned with the realities of the academic environment. During this monitoring process, it is important to be attuned to situations in which previously effective strategies aren't achieving the expected positive outcomes.

ATL's products and services, effective until recently, are no longer achieving the same positive outcomes. This sort of change would be expected in the dynamic field of educational technology,

> *...in extremely dynamic industries alignment between a firm's strategic intent and strategic action is not likely to last. Inevitably, strategic actions will begin to lead or lag strategic intent. Such divergences between intent and action cause 'strategic dissonance' in the organization.*
>
> (Burgelman & Grove, 1996, p 8)

Strategic dissonance can be used as a lever for improvement within an organization if it results in a thorough analysis of the organizations external environment and internal capabilities. This sort of analysis is often referred to as a strategic analysis. There are many methods for conducting a strategic analysis that will enable an organization to improve its approaches rather than experience ongoing failure.

The Virtual Retina CD-ROM project is presented here as an example of strategic dissonance, the Achilles heel of many educational technology units. Following this case, a number of methods for analyzing the strategies used by educational technology units are presented. These methods provide a means for units in higher education to conduct the ongoing task of maintaining their strategic plans.

The Virtual Retina: A high-tech case study

ATL employs twenty staff members whose range of expertise includes instructional design, evaluation, multimedia development, Web authoring, and graphic arts. ATL provides grants for ATL partnerships to instructors as the U of A. The grant includes money intended to support release time for instructors to work in the ATL production studio learning instructional design and technical production skills. ATL also offers a diverse range of workshops related to teaching and technology to the campus.

The Virtual Retina CD-ROM was created through an ATL partnership grant provided to the Department of Ophthalmology at the U of A. The project team consisted of three ophthalmologists, a medical student, an instructional designer, an Authorware developer, and a graphic artist. For the Virtual Retina partnership, the grant was used to employ the medical student to work full time in the ATL production studio for six months. The project lasted from December 1999 to August 2000.

The CD-ROM contains a virtual clinical environment to provide residents with skills and experience related to diagnosis of diabetic retinopathy, a leading cause of blindness in developed countries. As some diabetic pathologies are clinically diagnosed by their 3D appearance, problem-based cases require learners to evaluate 3D digital photographs. Through this application, learners

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acquire a thorough understanding that would otherwise take an extended period of time to achieve through traditional clinical observation. The Virtual Retina CD-ROM contains the following features:

Case-based problem solving: In the CD-ROM's Clinic, learners practice diagnosing and prescribing treatments for a comprehensive set of pathologies without being dependent on the availability of patients.
3D digital imagery: Digital imagery has been used in ophthalmology for some time now, but never in 3D. The observation of the stereographic appearance of several diabetic retinopathic lesions is vital to diagnosing and managing patients. A partnership with Stereoviewer Inc. has enabled the incorporation of this advanced technology.
Interactive tutorials: Highly visual tutorials accompanied by decision trees provide vital background knowledge about diabetic retinopathy and illustrate the diagnostic decision making process.
Library of articles: Learners can acquire copies of comprehensive literature reviews on pertinent topics in diabetic retinopathy.
Glossary: Key terms are defined and hyper linked throughout the application.

The Virtual Retina CD-ROM will be used by approximately five ophthalmology residents a year at the U of A. It will also be available at no cost to Canadian ophthalmology schools of which there are nine English-speaking and two French-speaking programs. The Virtual Retina application is sound pedagogically and has superior production values.

Despite the obvious merits of the Virtual Retina CD-ROM, the project has been the topic of much debate at ATL. One concern is that the project consumed a significant amount of resources, yet will only be used by a handful of medical residents a year. How does an educational technology unit evaluate whether to develop resources that will be used by five ophthalmology residents a year versus resources that might support 400 first year students? Does the Ophthalmology department, through the sponsorship of charitable foundations such as Canadian National Institute for the Blind and the Canadian Diabetes Foundation, better fund a project such as the Virtual Retina?

Secondly, while the ophthalmology instructors were the primary partners for this project, they had little time to devote to contributing content or being involved in the ongoing development effort. Thus, the U of A faculty members did not develop any new skills and understanding related to teaching and technology, which is the intended outcome of the ATL partnership program. The medical student acquired many skills related to multimedia development including multimedia script writing and project management. However, he is not part of the university teaching staff, so ATL's primary function of being a professional development rather than production unit was not realized with this project. This is an excellent example of strategic dissonance…the intent of the ATL partnership was only partially realized despite extensive support and a high-quality product as an outcome. This situation was experienced in other projects at ATL over the course of the past year.

Are CD-ROM projects inherently too costly to be sustained by campus-based technology centres? Or, should more of this high-end type of production be supported? How do organizations such as ATL and other campus educational technology centres formulate the strategies they will use on an ongoing basis? While people are generally aware of how to compose mission and vision statements, the path to a clear set of operational strategies is one full of dead-ends and morasses of detail.

Using strategic analysis strategies

While ATL's business plan is full of noble goals, a precise set of operational strategies is lost within the exhaustive lists of tasks. Strategic planning involves assessing both the external competitive environment as well as the internal capabilities of an organization to meet the demands of the campus environment. In the following, a sampling of methods will be used to assess the internal resources and competitive capabilities of ATL. These methods include strategic mapping, SWOT analysis, value chain analysis, and competitive strength assessment.

Descriptions of methods for conducting strategic analysis are usually framed for business and industry environment and are fraught with terms such as "rival", "marketplace", and "threats." These terms are not commonly used within academia. However, perhaps they should be. Often campus units, such as ATL, flounder as they apply imprecise planning models. A more "business-like" approach to strategic analysis can yield many valuable insights and is appropriate for the public sector in general and universities in specific (Poister & Streib, 1999; Tischler, Biberman, & Alkhafaji,1998).

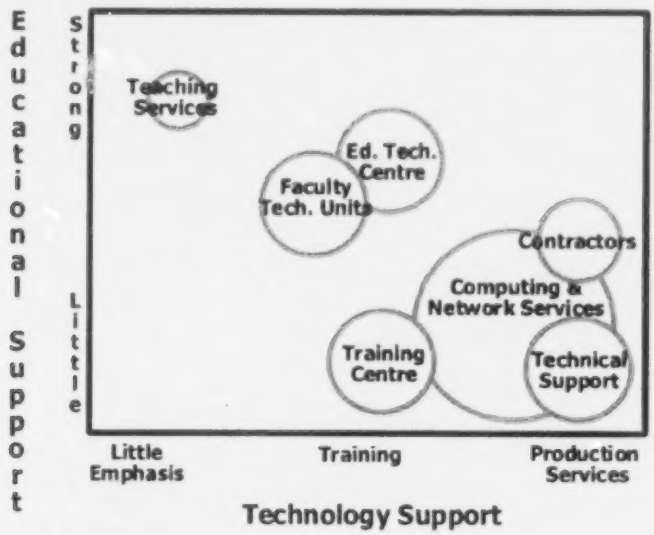
Several questions will be used to structure the discussion. The answers to these questions provide a number of vantage points from which to view ATL's strategies (Thompson-Strickland, 2000). This process is one valuable not only for ATL, but also for other educational technology units coping with the ever shifting dynamics of educational technology implementation on their respective campuses.

What is the unit's external competitive environment?

ATL is located on a campus that serves approximately 30,000 students. It has a faculty of tenured and part-time teaching staff approaching 3,000. A number of other centres on campus serve this population of instructors. Some provide services that overlap ATL's. To remain viable, ATL must demonstrate that it is filling an important niche on campus. It must continue to differentiate its services in a way that satisfies University Hall's desire to avoid redundancy and support only those organizations adding true value to the university.

Strategic maps are one way to visualize the relationship of an organization to other "competitors." While units situated on campuses are sheltered from the full force of a free market, they are funded by central administration and vie for the limited funds available. In this sense, an educational technology unit's competitive market consists of the centres that support teaching and technology use on campus. A strategic map such as shown in Figure 1 depicts how campus-based units position themselves related to supporting academic staff members at the U of A.

Figure 1: Strategic Map of a Campus Educational Technology Centre



In the above map, technology and educational support have been chosen as the two axes. However, any two variables that distinguish the activities of organizations can be used. A circle roughly proportionate to the size of its operating budget represents each entity.

The map demonstrates a clustering of centres in the lower right quadrant. These centres are largely technology focused with little emphasis on effective teaching. In the map, it is evident that ATL serves an important niche by providing services related to both instruction and the application of technology and is currently favorably located on the map. The proximity of the faculty-based units to ATL illustrates their direct competition with ATL. A number of questions that arise with respect to ATL and campus technology units in general in connection to the strategic map. What services do the units offer that overlap with other organizations? How might ATL operate to capitalize on its niche and maintain or expand funding? How might ATL position itself in relationship to faculty-based units to avoid losing funding as more and more of these centres develop on campus? Some of the answers to these questions may be achieved from an internal analysis of ATL guided by the following five key questions.

How well is the present strategy working?

The competitive approach ATL uses is to provide a differentiated range of services that are not available elsewhere on campus. Clear standards to evaluate ATL's success are absent from ATL's strategic plan. However, several means that might be used for this type of evaluation are suggested below.

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Table 1: Success Indicators for ATL

Success Indicators	Evaluation of level of success
Proportion of target population served	On a recent survey, respondents indicated that 22% had accessed ATL's services while 40% had accessed the campus teaching centre's services.
Cost effectiveness compared to other centres, both on campus and off	Smaller faculty-based centres may also be viewed as more cost-effective.
Partners' evaluations of services	Research is underway on this issue
Number of new media resources created	This isn't tracked effectively. Projects often take a long time to complete and there are some, which do not result in the development of resources.
Utilization of ATL's production studio	Below capacity.
Impact on teaching and learning on campus	This is tough one! But, ultimately an indicator critical to ATL's long-term competitive success.

Given that indicators such as profit margins are not relevant to ATL, one strategy for this centre is to benchmark its key activities against other educational technology centres both on and off campus. To keep its competitive advantage on campus, ATL must become proactive in determining standards for measuring its success and in developing strategies to achieve these standards.

What are the organization's resource strengths and weaknesses and its external opportunities and threats?

A SWOT analysis is a review of an organization's resource strengths and weaknesses contrasted with its external opportunities and threats. This analysis enables planners to aim to produce a good fit between an organizations capability and the demands of its market situation. ATL's SWOT analysis appears in Table 2.

Table 2: SWOT Analysis for ATL

Potential Resource Strengths & Competitive Capabilities	Potential Resource Weaknesses and Competitive Deficiencies
• expertise in instructional development and evaluation • technical expertise in new media • well-endowed technical facility • direct contact with VP Academic • recognized campus leader in instructional technology development	• under-utilized facility capacity • R & D not adequately supported by skilled staff • greater emphasis on excellence in research rather than on superior teaching on campus
Potential Opportunities for ATL	**Potential External Threats**
• faculty-based units don't have resources for R & D • increasing impetus for higher education to review curriculum • distance education programs expanding • ever increasing need for production support	• possible pressure to become a cost-recovery centre • shift to early-majority adopters changes typical client needs • faculty-based centres might duplicate services and request central funding • proliferation of workshops related to technology

For ATL to sustain is position on campus, it must capitalize on internal resources that are *...valuable, rare, and costly-to-imitate...* (Barney, 1995). The combined skills of instructional development and educational technology meet these criteria as they are rarely found on campus and are hard to duplicate. These competencies are further augmented by ATL's financial capability to support research and development in the field of instructional technology. These competencies are what ATL does best and will insulate it from many of its external threats. Market opportunities to heed are the

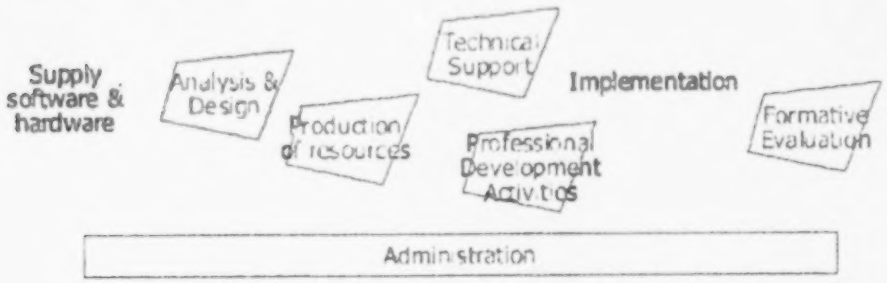
needs of faculty-based units for support, the ever-increasing impetus on campus for new media production support, and the expanding number of distance education programs.

Are the educational technology unit's prices and costs competitive?

One of ATL's most powerful clients is University Hall as it funds ATL. Therefore, it is essential that ATL demonstrate a solid return on investment for this funding. Faculty members are also clients. As most of ATL's services are available at no cost, a critical cost for faculty members is time spent on projects. ATL must manage its projects in a time efficient manner to satisfy these clients.

A value chain analysis reveals the core activities used to design, produce, market, deliver, and support a product or service. ATL's value chain is shown below. The lighter boxes indicate services that ATL does not provide.

Figure 2: ATL's Supply Chain



While value chains typically show a flow between one activity and the next, an important characteristic of ATL's value chain is that the activities are not necessarily integrated or sequential. Clients often access ATL at various segments of its value chain. For example, ATL staff members are frequently asked to provide technical assistance to faculty members who haven't been involved in any way with ATL previously. While random access to workshops may be supported, random access across the value chain leads to a fragmented, costly approach. Staff work with bits of projects out of context and aren't able to assure a high-quality outcome. As well, staff members are continually disrupted in their work and are unable to complete high priority projects. ATL has not been positioned as a help-desk service provider, yet much time is devoted to this sort of response to the detriment of other activities. On a strategic level, ATL's value chain should be integrated and streamlined to avoid falling into the *something for everyone* trap.

Porter (1996) stresses the importance of making trade-offs and integrating activities to assure that an organization achieves and maintains its competitive advantage.

> *There will be constant pressures to compromise, relax trade-offs, and emulate rivals. One of the leader's jobs is to teach others in the organization about strategy—and to say no.*
> (Porter, p 77)

Tradeoffs are prerequisite to strategic planning because of problems due to:

- inconsistencies in image and reputation
- different activities require different product configurations, different employee behavior, different skills, and different management systems
- limits due to internal coordination and control

For ATL, making trade-offs might mean providing technical support to only those clients that are involved with ATL on a complete project. Activities would also be aligned to focus on activities that are of a high value to ATL strategically. For example, other campus centres provide technical help-desk support or technical training workshops. ATL should divest itself of these activities and focus on activities related to maximizing the number and quality of instructional technology projects it supports. This sort of approach involves a number of difficult decisions for ATL. Its management will be well advised to consider Porter,

> *...a strategic position is not sustainable unless there are trade-offs with other positions.*
> (Ibid, p 68)

In all of this, operational effectiveness must be assured (Porter, Strickland-Thompson, 2000). Activities in ATL's value chain are often highly time-consuming for ATL staff members and their

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clients. Streamlining the analysis, design, and production process will be essential to effective operations. Project management is gradually evolving at ATL. It is a difficult process as many aspects of the university environment are at odds with a more business like production process.

How strong is the centre's competitive position?

In a business environment, the success factors are used to evaluate a business's competitive advantage. In an academic environment, analyzing the success factors indicates the strengths and attributes of ATL in comparison to other centres on campus that also address teaching and/or educational technology. A preliminary outline of factors essential to ATL's success is listed below.

Table 3: Key Success factors for ATL

Factors
Instructional design expertise
Evaluation expertise
Technological expertise
Good communications & teaching skills
Reputation on campus
New product innovation capability
Project management skills
Academic research capability
Cost position relative to other campus centres
Production resources (hardware, software)
Customer service orientation

These success factors were circulated to ATL's management and staff who were asked to rank the importance of each factor. For several of the factors, staff responses diverged significantly from the director's. This suggests that more discussion needs to take place within ATL regarding its direction.

ATL should undertake to define its Key Factors for Success and reach understanding within the organization about the relative importance of each factor. Then ATL can use this inventory of factors to compare ATL's capabilities to other campus centres. For example, if ATL's production services are judged to be below par, while other centres are comparatively superior, ATL has at least two choices. It may choose to outsource the production aspects of projects to other units, or it could devote resources to increasing its capability in this area. Choices such as these impact whether or not ATL undertakes projects such as the Virtual Retina CD-ROM in the future.

What strategic issues do educational technology units face?

A number of experiences such as the Virtual Retina project have compelled ATL to ask sharp questions about the effectiveness of the various services it offers. As a result ATL has come to realize that many of its strategies have been tailored to address the needs of educational technology's "early adopters" at the U of A (Rogers, 1995). ATL's focused differentiation of products and services for this group is increasingly out of alignment with the characteristics and needs of the growing population of instructors using technology who may be categorized as being part of the "early majority." The characteristics of this model are summarized below and contrasted with an alternative model that is more attuned to the early majority of educational technology users on campus

Table 4: The Shifting Needs of Clients

	Early Adopter Model	Early Majority Model
Client	instructor	department
Instructional design	idiosyncratic	team effort
Process	residency at ATL	project meetings
Production	instructor (or assistant)	project team
Outcome	resources for single course	resources for several sections or program
Time available	extensive	moderate
Risk at evaluation time for instructor	high	low

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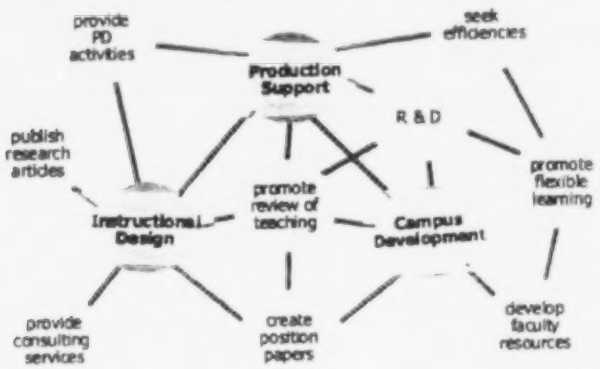
In reconsidering its strategies, ATL must avoid trying to straddle between two programs. This would occur if ATL attempts to combine significantly different approaches to professional development with existing programs and services. This approach is doomed to failure. Tradeoffs have to be made and accepted (Porter). The Virtual Retina project demonstrated something that as occurred on a number of ATL projects. The production model that required faculty members to learn then produce their own instructional resources is no longer a viable mode for faculty development. The early adopters' zeal for committing to long term, hands-on production is not matched by mainstream faculty members. Different strategies are needed for both production and faculty development.

In past strategic planning efforts, it seems that ATL management and staff have been swamped by the number and complexity of ATL's initiatives and have difficulty seeing the larger strategic structure of ATL's activities. The analysis methods described to this point enable people within an organization to develop an number of perspectives on both their external competitive environment and their internal capabilities to respond to this environment. Vanguard's Activity System Map is a good next step for ATL as it moves towards refining its existing strategic plan. This map represents the network of activities conducted by an organization. These types of maps...

> ...show how a company's strategic position is contained in a set of tailored activities designed to deliver it. (Porter, p 71)

A suggested Activity System Map for ATL is shown in Figure 3.

Figure 3: ATL's Activity System Map



After completing the Activity System Map a technology unit's management should ask the following sorts of questions:

- Are the activities consistent with the unit's overall positioning? (i.e. needs served, type of clients accessed)
- How do the activities within the unit reinforce or detract from each other?
- Could changes in how one activity is performed enable others to be phased out?
- What broad strategies and goals for the unit can be used to direct these activities?
- What are indicators for evaluating the success for each of these activities?

With an Activity Map the salient features of an organization become apparent. Broader strategies emerge and are readily translated into a concise strategic plan for the organization. At this point, educational technology units are ready to assess whether projects such as the Virtual Retina CD-ROM are aligned with the strategic plan.

Conclusion

Only a sampling of possible methods for analyzing an organization's external competitive environment and internal capabilities have been explored. There is a wealth of resources designed for business and industry that can be used to free up blocked strategic planning. Project's such as the Virtual Retina inform an organization that it is entering a period of strategic dissonance, a time when successful strategies no longer work on all dimensions. At such times, strategic analysis methods

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facilitate the asking and answering of fundamental questions related to direction, purpose, and relevance of core strategies used by an organization.

References

Barney, Jay B. (1988). Looking inside for competitive advantage. Reprinted in Stickland & Kramer, *Readings in Strategic Management*, 10th Edition. Boston: Irwin/McGraw-Hill, 130-143.

Burgelman, Robert A. and Grove, Andrew S. (1996). Strategic dissonance. *California Management Review*, 30/2, 8-28.

Poister, T. H. & Streib, G.D. (1999). Strategic management in the public sector. *Public Productivity & Management Review*, 22/3, 308-325.

Porter, Michael E. (1996) What is strategy? *Harvard Business Review*. November-December, 61-78.

Strickland-Thompson (2000). *Strategic Management*. McGraw-Hill/Irwin.

Rogers, E.M. *Diffusion of Innovations*. (1995). New York: Free Press.

Tischler, L., Biberman, J, and Alkhafaji, A (1998). A new strategic planning model for universities undergoing transformation. *International Journal of Commerce and Management*, 3/4, 85-101.

To find out more about the Virtual Retina application, please visit: www.virtualretina.com